http://www.nwitimes.com/news/local/iit-smart-grid-expert-talks-about-solutions-to-power-outages/article_798cd96d-942c-509f-89cf-fd5d3a08f727.html

URGENT

IIT smart grid expert talks about solutions to power outages, pollution, cyber security breaches at Purdue Northwest speaker series

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Smart-grid expert Mohammad Shahidehpour.

Provided

HAMMOND — Municipalities and their residents face major challenges including power outages, pollution and cyber security breaches now and in the future.

Creating one system known as the Smart Grid can manage the electrical grid, natural gas supply, telecommunications, traffic flow, public works and other critical services, according to Mohammad Shahidehpour, professor of electrical and computer engineering at Illinois Institute of Technology in Chicago.

An internationally recognized smart-grid expert, Shahidehpour kicked off the Purdue University Northwest School of Engineering Distinguished Speaker series Friday with a compelling argument about why it's possible — and necessary — for urban areas to thrive in a time of limited resources and global challenges.

"The integrated smart-city solution will enhance services, reduce costs and ultimately improve security, reliability, resilience and sustainability in large metropolitan regions," he told dozens of students and faculty at PNW's Center for Innovation through Visualization facility.

"The city doesn't get smart," Shahidehpour said. "The people get smart. The individuals are provided with useful information to make good decisions."

Fueling the need for smart-grid systems is the shift in population to bigger cities, he said.

"By 2050, 6.5 billion people, or 70 percent of the world's population, will move to big cities, creating more pollution, more traffic and more waste. We have to deal with these problems," he said.

Using Chicago as an example, Shahidehpour said commuters spend 300 million hours stuck in traffic, which contributes to pollution and uses more fuel.

Continued blackouts in Puerto Rico also demonstrate the need for a smart-grid system, he said.

A smart-city operation works because individual departments "talk to each other and share data," he said. "They collect data about how people spend time."

Major benefits stem from the smart cities/smart grid system, Shahidehpour said, including the following:

• It lays the foundation for improving the quality of life and well-being of citizens.

• It creates employment opportunities, meets individual citizens' needs and enhances economic development.

• It is an ideal pattern for technological innovations targeted at promoting global sustainability.

IIT operates such a smart-grid system thanks to seed money provided in 2006 by Bob Galvin, the late chairman of Motorola and chairman of the board at IIT, Shahidehpour said.

The IIT administration provided $5 million while a grant from the U.S. Department of Energy added $8 million to create the system at the university.

That smart-grid system was designed by Ph.D. students at IIT, and constructed between 2008 and 2013, he said. A combination of solar and wind energy charge batteries that will allow IIT's campus to run for four nights.

"There is a link to the utility company through two substations. We never get disconnected from the power grid," Shahidehpour said. "Four times a year, we simulate a power outage and inform everyone."

The IIT system was created with seven energy hubs each with electrical, natural gas and heating.

"The goal is to make sure the lights stay on," Shahidehpour said.

Creating those seven energy hubs now saves IIT $1 million a year in energy costs, he said.

Another technology being tested at IIT involves creating optimal use of traffic lights. A smart sensor is placed on the license plate of a vehicle that signals the vehicle's location. By knowing where drivers are, the system can control traffic lights to keep traffic flowing.

"It can extend green lights or reduce red light times," he said. "It adjusts the lights to reduce traffic."